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Attentional Bias for Threat in Intergroup Anxiety

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by

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Under the Direction of Erin Tone, PhD

ABSTRACT

Threatening faces draw our attention with particular speed, a phenomenon commonly documented using behavioral measures such as the facial dot probe task. However, other aspects of the face that such tasks often fail to take into account, such as characteristics that signal race, also may influence threat perception. If dot probe tasks are to continue to serve as key measures of threat bias in research, we must understand whether and how the facial contexts in which angry expressions appear influence people's attention to those expressions. The current study examined the ways in which emotional expression and facial race signifiers interact to convey threat in individuals with varying levels of racial intergroup anxiety. I proposed that participant race would moderate the relationship between intergroup anxiety and attentional bias to White and Black stimulus faces. One hundred and sixteen participants (Black = 58; White = 58)

completed a modified version of the facial dot probe task, as well as self-report measures encompassing intergroup anxiety and individual demographics. Results indicated that participant race did not significantly moderate the association between intergroup anxiety for Black or White threatening faces. However, key group differences in attentional biases for threat were evident. White participants, but not Black participants, displayed statistically significant biases toward Black threatening faces. Additionally, for White participants, but not Black participants, increases in intergroup anxiety were associated with increases in attentional bias for Black faces. These findings provide a first step toward understanding the influence that facial signals of race may have on attentional allocation for threat cues within the dot probe task. They also highlight the need for increased care when generalizing findings from dot probe studies to diverse populations. Suggestions for future research include investigating the potential contribution of implicit attitudes to attentional bias for outgroup threat and including gender as an intergroup variable.

INDEX WORDS: Intergroup anxiety, Attention, Threat perception, Race, Emotion, Dot probe

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DEDICATION

This thesis is dedicated to my family and friends, who grounded and supported me through this process.

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I would like to thank my advisor, Dr. Erin Tone, for her masterful guidance and unwavering kindness. Thank you to my committee members, Drs. Page Anderson and Heather Kleider-Offutt, for their expert and thoughtful counsel that sharpened this study.

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1 INTRODUCTION

1.1 Introduction and Overview

We pay attention to angry faces. While biases to attend to facial anger are most pronounced in people with anxiety disorders (Bantin, Stevens, Gerlach, & Hermann, 2016; Pergamin-Hight, Naim, Bakermans-Kranenburg, van Ijzendoorn, & Bar-Haim, 2015), they are also evident in the general population, particularly when faces are viewed very briefly (100 ms or less; Cooper & Langton, 2006; Santesso et al., 2008). This evidence that, for most people, angry faces quickly capture attention suggests that a preference for such cues in early visual attention may be a hard-wired (Zajonc, 1984), evolved bias to detect signals of imminent or potential danger (Ohman, Flykt, & Esteves, 2001). Like other evolutionarily-primed cues (e.g., snakes), angry faces have been shown to require minimal analysis at rapid speeds, thus facilitating quick defensive responses (Ohman & Mineka, 2001).

Angry expressions, however, are not the only facial characteristics that can convey threat. Humans rapidly evaluate faces with mature features, for example, as more threatening than those with juvenile features, such as large eyes and smaller nose bridges (Zebrowitz, 2017). They also tend to judge faces that more closely resemble familiar individuals as less threatening and more trustworthy (Zebrowitz, Bronstad, & Lee, 2007). The facial context in which an angry expression appears may therefore amplify or attenuate its threat value—anger on an otherwise non-threatening face may be evaluated differently than anger on a face with other characteristics that signal threat.

This surprisingly understudied possibility has important implications for the measurement of attention to facial threat. Commonly used measures, such as the facial dot probe task, a behavioral paradigm that yields estimates of a person's tendency to attend preferentially

to particular emotional faces, are predicated on the idea that threat emanates from a face's emotional facial expression alone. However, empirical tests of this assumption are lacking. If facial dot probe measures are to continue to serve as key measures of attention bias in research, it is critical that we understand whether and how the facial contexts in which angry expressions appear influence people's attention to those expressions.

The present study was designed as a step toward clarifying whether and how attention bias for angry expressions is influenced by the facial contexts in which those expressions appear. I chose to focus on visible characteristics that signify racial group membership as my key contextual variable, given evidence that racial outgroup cues, like angry expressions, can signal threat for some people, particularly those with high levels of intergroup anxiety, or fear about interacting with people who are not members of their own ingroups (Stephan, 2014). In the following sections, I provide a review of the literatures that form the foundation for this study. As a note, the language used to signify racial group membership for facial stimuli and participants varies across studies; however, I use the terms Black and White to reflect the most current guidelines for assigning labels to racial identity (American Psychological Association, 2010).

I first provide background on the dot probe task as a measure of attention bias for angry faces and on extant knowledge about other facial characteristics that may also capture attention in the context of this task. I then shift focus to the literature on how ingroup/outgroup signifiers, such as visible racially-linked characteristics, can both serve as independent threat cues and interact with emotional expressions to influence cognitive and behavioral responses, including attention, when people are viewing faces of racial ingroup and outgroup members. Next, I briefly survey the literature on intergroup anxiety and its associations with cognitive processing,

before introducing my study's hypotheses and design. I provide an overview of the methods implemented and the main results of the study. I end with a discussion of the implications of the results as well as study limitations and future directions.

1.2 Individual Differences and the Dot Probe

The visual dot probe task, which MacLeod, Mathews, and Tata first introduced in 1986, is one of the most widely used paradigms for examining attentional biases for threat. In short, the task provides a reaction time measure of attentional bias. During each trial, individuals rapidly identify the location or position of a probe that replaces one of two simultaneously displayed cues that differ according to a characteristic such as emotional valence (e.g., a neutral cue and a threatening cue). Faster responses, on average, for probes that replace a cue of one type (e.g., threatening) indicate a vigilant bias for that particular type of cue; slower responses, on average, are commonly interpreted as indicating avoidance.

In one of the most widely used variants of this task, researchers have examined whether a person presented with pairs of faces (typically, two pictures of the same model, one with a neutral expression, one with an angry expression) will be faster to locate a probe when it replaces the angry face than when it replaces the neutral face. Studies using the dot probe have found that, on average, angry faces, which signal the presence or possibility of threat, preferentially capture visual attention over more positive or neutral cues (Mogg, McNamara, Powys, Rawlinson, Seiffer, & Bradley, 2000; Yiend, 2010). The paradigm has yielded evidence of attentional biases for threat in a large body of research on individuals with anxiety (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorm, 2007), PTSD (e.g., Fani et al., 2012), eating disorders (Cardi, Di Matteo, Corfield, & Treasure, 2013), and alcohol abuse (Forestell, Dickter, & Young, 2012), as well as in studies of healthy samples (e.g., Santesso et

al., 2008). Although attentional biases for facial threat cues are most pronounced in highly anxious samples when stimuli are presented for relatively long durations (500 ms; Klumpp & Amir, 2009; Mogg, Bradley, Miles, & Dixon, 2004), biases to attend to angry faces are also evident in the general population when faces are displayed very briefly (100 ms or less; Cooper & Langton, 2006; Santesso et al., 2008).

1.3 Stimulus Variations and Attention Bias

Although the facial dot probe task yields evidence of a mean bias for threat, attentional patterns can be inconsistent at the individual level and overall reported effect sizes vary across studies (Bar-Haim et al., 2007; van Rooijen, Ploeger, & Kret, 2017). Some individual differences in attentional prioritization during facial dot probe tasks may occur because, for some people, features of the face other than angry expressions carry threat value. Becker and colleagues (2007), for instance, found healthy participants to more quickly and more accurately detect anger on male faces than on female faces. Evidence also suggests that either averted or direct gaze, depending on the population under study and the contexts in which stimuli appear, may magnify perceptions of faces as threatening (Roelofs et al., 2010; Schmitz, Scheel, Rigon, Gross, & Blechert, 2012). Indeed, research findings indicate that various stimulus characteristics may combine with emotional valence to influence the motivational significance of a face, or the extent to which the face is relevant to an organism's needs and goals (Barrett, Mesquita, & Gendron, 2011; Lundqvist, Esteves, & Ohman, 2004).

Researchers who have developed facial dot probe tasks appear to have acknowledged, at least implicitly, the idea that faces can carry motivational significance as a function of characteristics beyond emotion (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007; Roelofs et al., 2010). In particular, facial dot probe tasks are commonly designed to ensure that stimuli

with male/female features or averted/direct eye gaze appear in a balanced way across trials. However, other stimulus characteristics that may influence attention, possibly by conveying threat, have received less attention than have gender and gaze in the contexts of both task design and performance interpretation. Characteristics such as those that indicate ingroup/outgroup status, which most published facial dot probe studies fail to take into account, warrant examination as well.

1.3.1 Ingroup/outgroup status cues as markers of threat

Facial features that serve as markers of ingroup/outgroup status—whether the viewed person belongs to the same group as or a different group from the viewer— are rapidly encoded, along with cues indicating membership in other categories, such as sex and age group (Cosmides, Tooby, & Kurzban, 2003). For example, skin color, eye shape, and nose width are commonly perceived as indicators of membership in a racial group (e.g., Stepanova & Strube, 2009). Both theory and empirical data suggest that such featural details can contribute to a face's motivational relevance, or the degree to which the face stimulates approach or avoidance.

Cosmides et al. (2003) proposed that people rapidly encode race-linked cues because they offer clues about danger in our environments. According to their model, we typically view features that phenotypically resemble our own as signals of safety, and thus find them preferable to those that look different, and that therefore may represent threat. Cosmides and colleagues suggest that, because there is no part of our "cognitive architecture" that is solely dedicated to the encoding of race, the human mind maps indicators of race onto a cognitive variable—coalition—that is built upon perceived (or misperceived) race-delineated social alliances.

Findings from at least two studies suggest that race may influence patterns of attention to faces within the context of the dot probe paradigm. Trawalter, Todd, Baird, and Richeson (2008)

briefly presented White, non-anxious participants with face pairs comprising one Black face and one White face (both neutral in expression). After 30 ms, a probe replaced one of the faces on each trial. Participants were faster to detect the probe when it replaced a Black face than they were when it replaced a White face. Trawalter and colleagues interpreted their findings as suggesting that the race of a stimulus face may itself elicit attentional prioritization for individuals of a different race. This prioritization, they proposed, occurs because people tend to perceive members of other groups as more threatening than ingroup members. In their 2008 study, they attributed their White participants' attentional bias toward Black faces specifically to a stereotype linking Black men and danger.

Donders, Correll, and Wittenbrink (2008) obtained similar findings using a spatial cueing task to measure attentional capture and maintenance in a small (n = 28) sample of White students, who also completed a measure of stereotype accessibility. In their study, the more readily accessible participants' danger stereotypes about Black people were, the faster Black faces captured their attention, even when prejudice and the effects of danger-irrelevant stereotypes were covaried. The authors suggest that these findings reflect an acquired conditioned response to Black faces among those participants who held the strongest stereotypes of Black people as dangerous or threatening.

1.3.2 Interaction of ingroup/outgroup status cues with emotional expressions

Other research indicates that race-linked characteristics may also affect the ways in which people perceive, interpret, and respond to a face's emotional expressions (Blair & Judd, 2011; Fani, Bradley-Davino, Ressler, McClure-Tone., 2011; Ito & Urland, 2003; van der Schalk et al., 2011). One study, for example, found that White participants showed a preferential bias in recognition accuracy for ingroup (White) compared to outgroup (Black) faces when expressions

were neutral; when expressions were angry, participants identified outgroup (Black) faces more accurately (Ackerman et al., 2006). Moreover, Chiu, Ambady, and Deldin (2004), found that race and emotional valence of facial stimuli together modulated early cognitive responses to emotional ingroup and outgroup faces in a nearly exclusively White sample (1 participant identified as Asian). Specifically, relative to low-prejudice participants, high-prejudice individuals who were cued to expect an angry, black face on a screen displayed a weaker response in the early contingent negative variation (CNV) component of the event-related brain potential (ERP), which is implicated in controlled anticipatory responses to a warning stimulus (Brunia & van Boxtel, 2001) and modulated, under some circumstances, by emotion (Hart, Lucena, Cleary, Belger, & Donkers, 2012). The weaker CNV in high prejudiced individuals in anticipation of viewing black angry faces suggested a reduced tendency to monitor automatic stereotype-driven responses to angry outgroup faces. Those who endorsed high levels of prejudice also responded more quickly to angry Black faces. The authors attributed this pattern of findings to difficulty suppressing prejudiced behavior among the high-prejudice participants, and noted this was consistent with the weaker CNV findings.

Results from a few neuroimaging studies raise the possibility that these interactions between racial and emotional cues may occur, at least in part, because race-linked features elicit brain activity in regions that also activate in response to threatening facial expressions (Checkroud, Evertt, Bridge, & Hewstone, 2014). In one functional magnetic resonance (fMRI) study, for example, White participants viewed briefly presented (either 30 ms or 525 ms) emotionally-neutral Black and White faces (Cunningham et al., 2004). Activation in the amygdala, a structure in the medial temporal lobe implicated in the perception of emotional salience (particularly threat) (Phelps, 2006), was stronger for Black than White faces presented

for 30 ms. No differences emerged in this region when faces remained on the screen for 525 ms. At the longer presentation time, however, Black faces elicited more activity in brain regions such as the dorsolateral prefrontal cortex (DLPFC) and anterior cingulate cortex (ACC), both of which appear to play roles in regulation and executive control (Chen, Zhao, Song, Guan, & Wu, 2017; Krill & Platek, 2009). Notably, this finding is in line with other fMRI research that has linked DLPFC and ACC activation with attempts among individuals who value being unprejudiced to "control" automatic reactions to outgroup stimuli presented at long (2000 ms) durations (Richeson et al., 2003). Taken together, these findings suggest that people very rapidly register the emotional salience of racial group membership, but then quickly modulate their automatic affective responses.

There is also recent evidence from neuroimaging research that, consistent with Donders and colleagues' (2008) interpretation of their findings regarding attention bias for Black faces, the increased amygdala activity observed in White people in response to Black faces compared to White faces reflects a *learned* response to potential threat. Telzer and colleagues (2013) conducted fMRI scans of 32 youths (ages 4-16 years) while they viewed Black and White faces. Their results indicated that distinct neural responses to race were not evident until early adolescence (Telzer et al., 2013). Moreover, participants with more racially diverse peer networks showed weaker amygdala responses to other-race faces than did those with more homogeneous peer groups. The authors interpreted these findings as evidence that culturally-learned associations of particular group with threat and danger may shape amygdala sensitivity to race.

1.3.3 Ingroup/outgroup status cues and attention bias for threat in faces

To summarize briefly, findings from several lines of research suggest that race-related facial characteristics interact with emotional expressions to influence how people categorize, remember, and interpret faces (Ackerman et al., 2006; Ambady, Chiao, Chiu, & Deldin, 2006; Hugenberg and Bodenhausen, 2003). Few studies have begun to examine whether facial indicators of racial ingroup/outgroup status may modulate patterns of *attention* toward anger. In one study, Otten (2016) found evidence that race and emotion together may guide attention to faces, much as they influence other cognitive processes, during a visual search paradigm. Participants, who were mostly White or Asian American, were faster to detect angry and frightened faces within arrays of neutral faces (always an equal number of White and Black faces) when the target faces were Black than when they were White. When happy faces served as targets, however, participants showed no attentional preferences for faces of either race. These findings suggest that, at least for White and Asian American adults, when a face possesses both outgroup (Black) and negative valence characteristics (anger), it may be particularly quick to draw attention.

1.3.4 Viewer race and attention bias for threat in same- and other-race faces

Most studies of race and attention bias have recruited exclusively White samples; it is thus unclear how readily their findings generalize to members of other racial groups, particularly those that represent minority or marginalized identities. In one of the only studies to use a fully balanced (participant race by stimulus race) design, Dickter and Bartholow (2008) collected both behavioral and ERP data from Black and White adults while they completed a computerized flanker task. During each trial of this task, pictures of Black and White men and women appeared in five-item arrays (four flanker faces surrounding a target face; all had neutral

expressions). Participants were asked to rapidly identify the gender of the face in the center of each array. Results revealed that stimulus race, though task-irrelevant, influenced attention, such that participants responded more slowly when flanker faces were of a different race than the target face.

Crucially, *participant* self-identified race interacted with target face race to influence patterns of ERP response. Indeed, White and Black participants showed near-opposite patterns of electrocortical activity. For White participants, P300 amplitudes, markers of early attention that have been linked to perceptions of threat (Corell, Urland, & Ito, 2006), were enhanced when the target face was Black. For Black participants, the same pattern was evident when the target face was White.

Broadly, Dickter and Bartholow's (2008) findings suggest that both stimulus and participant race figure in split-second decisions about where to direct our attention when we are confronted with complex social cues, such as faces. Faces provide a wealth of potentially useful information; individuals must selectively direct attention to characteristics most likely to be functionally important. Dickter and Bartholow's (2008) study provides evidence that individuals from different racial groups show distinct patterns of attention to ingroup and outgroup faces; however, it leaves open the question of whether the emotional valence of ingroup and outgroup faces may enhance or attenuate these attentional patterns or vice versa. In addition, it provides little information about why outgroup faces capture attention—although both theory (e.g., Cosmides et al. 2003) and empirical data (Trawalter et al., 2008) suggest that they may do so because they represent threat, it is also possible that they are salient for other reasons, such as novelty.

One way to evaluate whether components of a face beyond emotional expression influence attention for threat is to focus on a group of individuals for whom other facial characteristics connote danger or threat. Such an approach permits examination of whether ostensibly universal threat cues such as angry expressions acquire increased salience and motivational significance when they appear in the context of other facial cues that some individuals link to danger. People who experience a type of anxiety that has been termed "intergroup anxiety" (Stephan & Stephan, 1985), constitute a useful population for such an investigation.

1.4 Intergroup Anxiety

Intergroup anxiety has been defined as a type of anxiety that individuals experience in anticipation of or during interactions with members of other groups (Stephan & Stephan, 1985). How one's affiliated group is defined can vary widely; for example, one's ingroup might comprise those of the same race, age, religion, or nationality. Stephan and Stephan (1985) noted that because intergroup anxiety is inherently characterized by worry about social interactions, it may be most appropriately viewed as a type of social anxiety that is specific to intergroup contexts—that is, contexts that involve interaction with members of other groups.

Affectively, intergroup anxiety is marked by apprehension, aversion, and fear both in anticipation of (Britt, Boniecki, Vescio, Biernat, & Brown, 1996) and during (Amodio, 2009) intergroup exchanges. In addition, individuals with high levels of intergroup anxiety, at least those with anxiety regarding race, have been shown to exhibit increased blood pressure, cortisol levels, and galvanic skin responses in real or imagined intergroup contexts (Littleford, Wrights, & Sayoc-Parial, 2005; Trawalter, Adam, Chase-Lansdale, & Richeson, 2012). Notably, physiological responses among intergroup anxious individuals during real or hypothetical

ingroup interactions in these studies were comparable to those of peers who endorsed minimal intergroup anxiety, suggesting the anxiety that they experience is specific to interactions with outgroup members.

More recent work suggests that, while certain concerns are likely shared across individuals with high levels of intergroup anxiety, group-level differences such as majority/minority status also appear to be associated with distinct intergroup worries. For example, whereas racial majority group members may worry primarily about appearing prejudiced, racial minority group members may, in contrast, worry primarily about being discriminated against (Doerr, Plant, Kunstman, & Buck, 2011; Shelton & Richeson, 2006). The most widely implemented measure of intergroup anxiety yields a unitary score (Stephan & Stephan, 1985) that incorporates questions assessing for both types of potential anxiety to account for potential differences in the experience of interracial interactions. Though the central concerns of people with intergroup anxiety may vary, depending on whether or not they identify with a group that is dominant or in the majority, they share tendencies to perceive ingroup members positively and outgroup members negatively (Stephan & Stephan, 1985) and to have stronger negative implicit associations for outgroup than ingroup individuals (Amodio & Hamilton, 2012). They also tend to expect negative outcomes from outgroup interactions (Plant & Devine, 2003). Further, high levels of intergroup anxiety have been linked to other relevant, and potentially related, variables including outgroup prejudice, stereotypes, and magnified threat perception (Riek, Mania, & Gaertner, 2006).

1.4.1 Intergroup Anxiety and Visual Perception

While no published research appears to have examined patterns of attention for threat from ingroup and outgroup individuals in people with intergroup anxiety, intergroup anxiety has

been shown to relate more broadly to perceptions of and responses to visual cues. For example, Amodio, Harmon-Jones, and Devine (2003) found that White individuals who obtained high scores on a measure of external motivation to respond without prejudice (high-EM; a commonly-studied facet of intergroup anxiety) showed stronger startle eyeblink responses when presented with Black faces than when presented with White faces. The authors interpreted their findings as consistent with a pattern of early attention and aversive reaction to the outgroup faces among high-EM participants.

Similarly, Ofan, Rubin, and Amodio (2014) found that high-EM White individuals showed larger responses in the N170 component of recorded event-related potential (ERP), an electrical signal that peaks shortly after faces are visually presented (Carmel & Bentin, 2002), when viewing Black compared to White faces. The authors concluded that their findings represented further evidence that intergroup anxiety modulates very early stages of processing. Specifically, they suggested that outgroup (Black) faces, which were especially relevant to high-EM participants' social-evaluative concerns, elicited preferential neural responses.

Researchers have begun to probe whether this high-EM aspect of intergroup anxiety is associated with performance on behavioral measures of early visual attention as well. For example, Richeson and Trawalter (2008) found significant attentional biases for outgroup faces in high-EM individuals relative to low-EM peers during a dot-probe task that presented Black/White face pairs with either neutral or happy expressions as stimuli for either 30 ms or 450 ms. White high-EM participants displayed an attentional bias toward Black faces in Black/White neutral pairs and only on trials when face pairs were presented for 30 ms. This attention bias was not evident during trials with Black/White happy pairs. Although one effort to replicate this study through the Reproducibility Project failed (Lai, 2012), Richeson and colleagues have since

published additional research that supports their earlier findings; in this newer work, they used eye tracking methodology to index attention. In a follow-up study, participants high in EM compared to those low in EM displayed an initial orienting of attention, as evidenced via eye tracking, toward Black faces in Black and White facial dyads (Bean et al., 2012). The authors interpreted this finding as indicative that for White participants high in EM, Black faces may serve as a social threat cue and thus rapidly capture attention, similar to findings from other studies that have demonstrated biases toward sample-relevant threatening stimuli (Mogg & Bradley, 2002).

1.5 Summary and Introduction of Present Study

Dot probe tasks are a widely used measure of attention bias, and although their psychometric properties have been questioned (e.g., Price et al., 2015), studies using these tasks have yielded fairly consistent evidence that humans are biased to attend to threat cues, particularly if the cues are linked to a salient source of threat for a given individual. If these measures are to continue to serve as key measures of attention bias in research, it is critical that we understand fully the factors that drive patterns of response. Taken together, the literature to date suggests that race-related features and emotional expression can be conflated in evaluations of threat. Existing data do not, however, clarify whether threat associated with angry expressions and threat associated with racial signifiers may combine for some people to intensify or otherwise modulate attentional biases that are measured with dot probe tasks.

Therefore, this project aims to explore the potential influence of additional facial indicators of threat, namely features that connote racial group membership, on attentional bias for angry faces in the context of the dot probe task. I predict that emotional expression and the model's race will each contribute to attention bias, such that a) all participants, regardless of their

intergroup anxiety, will show biased attention toward angry faces, and b) intergroup anxiety will be more strongly associated with biased attention toward anger displayed by members of participants' outgroups than anger displayed by members of participants' ingroups. In other words, at higher levels of intergroup anxiety, bias to attend to outgroup faces that are also angry should be higher. At lower levels of intergroup anxiety, there should be no significant difference between bias scores for ingroup and outgroup angry faces.

Thus, for White participants at higher levels of intergroup anxiety, threat bias will be stronger when Black threat/neutral face pairs serve as stimuli than when White threat/neutral face pairs serve as stimuli. For Black participants at higher levels of intergroup anxiety, threat bias will be stronger when White threat/neutral face pairs serve as stimuli than when Black threat/neutral face pairs serve as stimuli. Participants of either race with low levels of intergroup anxiety are expected to show a general threat bias (comparable patterns of attention to White and Black angry faces).

2 METHODS

2.1 Participants

Participants were recruited from the Georgia State University psychology department research pool as well as from paper flyers advertised on the downtown campus. Study participants comprised 116 individuals aged between 18 and 34 years (M = 20.12). Participants eligible to enroll in the study were those who identified as primarily Black/African-American or White/Caucasian, native English speakers, and adults between the ages of 18 and 40, and who possessed normal or corrected vision. Recruiting individuals from an urban campus that ranks nationally for racial and ethnic diversity (U.S. News & World Report, 2018) facilitated an even distribution of participants who self-identify primarily as

Black/African-American (n = 58) or White/Caucasian (n = 58). Participants were mainly undergraduate students (59 freshmen, 19 sophomores, 15 juniors, 17 seniors, two unsure of undergraduate class placement), although the sample also included graduate students (n = 2) and university staff (n = 2). Across the full sample, 30 participants identified as male, 82 as female, two as gender-fluid, one as non-binary, and one as a transgender man (see Table 1 for full sample and group demographics). All participants provided informed consent to participate in this study, as approved by the Georgia State University Institutional Review Board.

Table 1. ***Participant Demographic Data***

	Black (n = 58)		White (n = 58)		Total (N = 116)	
	Mean	***SD***	**Mean**	***SD***	***Mean***	***SD***
Age	19.96	3.34	20.26	3.22	20.12	3.27
	#	**%**	**#**	**%**	**#**	**%**
Gender Identity						
Male	12	20.7	18	31.0	30	25.9
Female	45	77.6	37	63.8	82	70.7
Transgender man	0	0	1	1.7	1	0.9
Non-binary	0	0	1	1.7	1	0.9
Gender fluid	1	1.7	1	1.7	2	0.18
Education						
Freshman	28	48.3	31	53.4	59	50.9
Sophomore	12	20.7	7	12.1	19	16.4
Junior	6	10.3	9	15.5	15	12.9
Senior	10	17.2	7	12.1	17	14.7
Undergrad (unsure yr.)	0	0	2	3.4	2	1.7
Graduate Student/Staff	2	3.4	2	3.4	4	3.4

Notes. Gender identity terms reflect participant self-reported responses via survey item text entry. Groups (individuals who identified primarily as Black or White) did not differ significantly according to age, $t(111) = -.484$, $p = .630$. Additionally, there were no group

differences according to gender identity (Cramer's $V = .185$, $p = .409$) or education (Cramer's $V = .199$, $p = .467$).

2.2 Procedure

Participants completed consent and study procedures during a single visit to a lab space located on Georgia State University's campus. At the beginning of the visit, trained research staff reviewed the study procedures with participants, provided answers to participants' questions, and obtained informed consent. Participants completed all portions of the study, including 1) computerized self-report questionnaires, and 2) a computerized attention bias task. The order in which participants completed the two study components (self-report questionnaires and computer task) was counterbalanced across participants. After completion of the study, participants were provided with a debriefing sheet that outlined aims of the study and the ways in which their participation provided contributions to the field. The entire testing session, including consent, computer tasks, and debriefing procedures took approximately 45 minutes.

2.3 Measures

2.3.1 Measure of Intergroup Anxiety

The Intergroup Anxiety Scale (Stephan & Stephan, 1985). This 15-item self-report measure of intergroup anxiety has been revised and adapted for use in many studies (e.g., Barlow, Louis, & Terry, 2010; Van Zomeren, Fischer, & Spears, 2007; Vezzali & Giovannini, 2012). Each version, however, has maintained an emphasis on the emotional component of intergroup interactions. The scale requires respondents to select the degree to which they experience varied affective states (e.g., nervous, self-conscious, worried, afraid) in anticipation of different types of imagined intergroup interactions. Each of the 15 statements focuses on a different anticipated emotional reaction. Participants rate their

anticipated emotional responses to each statement (e.g., “meeting strangers and introducing yourself”) using a 10-point Likert-type scale (1 = “not at all nervous”, 10 = “extremely nervous”). The original measure focused on interactions with people of Moroccan origin; researchers typically modify the wording to be appropriate to the groups that are taking part in their studies. For the present study, I adapted the language of the scale to focus on *White/Black* intergroup interactions.

The internal consistency of the measure has been shown to be high across at least 16 studies (mean α = .91) (Stephan, 2014). When similar analyses were conducted on the intergroup anxiety measures used in this study, results were comparable. Cronbach’s alpha indicated that the intergroup anxiety measure possessed good internal consistency in both Black (α =.912) and White (α =.911) participant versions. One study reported moderate test-retest reliability (*r* =.49), with alphas of .79 at Time 1 and .82 at Time 2 six months later (Binder et al., 2009). Investigations of the discriminant validity of this intergroup anxiety measure have found intergroup anxiety to make unique contributions to predictions of negative outcomes such as prejudiced behavior and found the construct to correlate significantly with other measures of negative outgroup expectations, such as symbolic and realistic group threats and negative stereotypes (Stephan, 2014).

2.3.2 Attention Bias Task

Dot Probe Task. The 160-trial dot probe task was presented using Eprime 2.0 (Psychology Software Tools, Pittsburgh, PA) software to ensure consistency of stimulus presentation timing. Each 1700 millisecond (ms) trial consisted of a 500 ms fixation, a 100 ms “cue” (a face pair), and an 1100 ms “probe” (asterisk). Participants were told to indicate the location (right or left on screen) of the probe via keyboard key press. The intertrial interval

(ITI) varied randomly between 750 ms and 1,250 ms as is commonly recommended as a precaution against potential interference or carry-over effects from trial to trial (Compton, Heaton, & Ozer, 2017).

Facial stimuli were selected from four sets of validated images: the NimStim set (Tottenham et al., 2009), the Productive Aging Face Database (Minear & Park, 2004), images used by Bradley and colleagues (1997) in a widely-used dot-probe task version, and the GSU Diverse Faces set (Schmidt, Davis, & Tone, 2012). The selected images were determined to be good exemplars of threatening, happy, and neutral expressions based on undergraduate students' ratings. Students judged how well each face represented the emotion it was intended to convey and how distinct the faces were from other emotional expressions (Schmidt & Tone, 2014).

Face pairs each represented one of three conditions: paired neutral faces (neutral-neutral trials); angry face paired with a neutral face (threat-neutral trials); or happy face paired with a neutral face (happy-neutral trials). For threat-neutral and happy-neutral pairs, an emotional and a neutral expression from the same person was paired; for neutral-neutral trials, the same image appeared on both sides of the screen. Facial stimuli included grayscale images of White and Black models, with an equal number of male and female faces. No model appeared more than once in the task. In the total 64 threat-neutral and 64 happy-neutral trials, the emotional face appeared on the left 50% of the time.

For both threat and happy pairings, there were eight possible stimulus conditions (balanced combinations of the following characteristics: emotional face location, face gender, face race), with eight trials per condition. The probe replaced an emotional picture in half of the emotion-face (congruent) trials and a neutral face during the other half (incongruent). In the 32

neutral-neutral trials, the probe appeared on the left 50% of the time. For neutral-neutral pairings, there were four possible stimulus conditions (balanced combinations of face gender and face race), with eight trials per condition. The order of trials was randomized for each participant.

Participants were instructed to press one of two keyboard buttons to indicate whether the probe appeared on the left or the right of the screen. Faster response times on average to probes that replaced emotional facial stimuli than to probes that replaced neutral faces indicated an initial orientation or vigilance for that emotion. Bias scores were calculated from response times to probes that replace threatening faces, as threat has been consistently associated with increased vigilance in anxious populations (Bar-Haim et al., 2007). For responses to both Black threat and White threat, mean response latency for congruent trials (probe replaces threat face) was subtracted from latency for incongruent trials (probe appears on opposite side of the screen from the threat face). Positive bias scores indicated an attentional bias toward threatening faces relative to matched neutral faces, and negative bias scores indicated a bias to direct attention away from threatening faces.

A recent meta-analysis by Bar-Haim and colleagues (2007) showed that across dozens of studies that have used the dot probe task, the computer measure successfully distinguished response patterns between anxious and non-anxious groups. While the task is effective in this regard, several empirical studies have found that it shows low internal consistency and test-retest reliability (Price et al., 2015; Waechter, Nelson, Wright, Hyatt, & Oakman, 2014; Waters, Lipp, & Spence, 2004). In a recent review, Price et al. (2015) noted that task reliability may vary as a function of sample (e.g., clinical, subclinical, type of anxiety), task design (e.g., stimuli, presentation times, vertical vs horizontal pair display, etc.), and analytical procedures. For this reason, Zvielli, Bernstein, and Koster (2015) suggested using trial-level

bias scores (TL-BS), obtained by calculating the difference in reaction time between each threat-congruent trial and its neighboring threat-incongruent trial. Essentially, this approach allows for sensitive measurement of attention bias fluctuations on a trial-to-trial level. In their own investigations, Zvielli and colleagues have found that scores on an attention bias variability index, which accounts for the variability in bias across the span of the task, explain more variance between anxious and nonanxious samples than do scores on the more traditional aggregated mean index introduced by MacLeod et al. (1986), which assumes attentional bias is a static rather than variable or fluctuating phenomenon.

In this study, I calculated the widely-used aggregated mean index of attention bias, to allow for more meaningful comparisons and extensions of previous dot-probe work. However, I also calculated threat-level bias and bias variability scores, that might provide additional insight into the stability and general nature of attention bias for threat. So that I could acquire the required number of trials and meet the recommended standards to calculate threat-level bias scores (Zvielli et al., 2015), participants completed a second 96-trial dot probe block immediately following the main task. This additional dot probe block included only angry-neutral (64) and neutral-neutral (32) trials. Limiting trials in the block to angry-neutral pairs increased the likelihood of obtaining the required number of trials to implement TL-BS. It also reduced potential interference from trials (e.g., happy-neutral pairs) excluded from analysis. I counterbalanced threat and probe location just as I did in the first dot probe block.

2.3.3 Demographics Survey

The Center for Collegiate Mental Health (CCMH) Standardized Data Set (SDS) demographic questionnaire is a self-report measure that yields information about age, gender identity, race, and other demographic and personal characteristics. The measure was developed

explicitly for use with college students (Locke, Bieschke, Castonguay, & Hayes, 2012). The survey items represent questions often asked of students seeking mental health services at university counseling centers; they were selected based on input from over 100,000 college students seeking mental health treatment across 770,000 appointments and 2,700 clinicians at 139 college and university counseling centers (Center for Collegiate Mental Health, 2016). Participants were provided with 18 core items from the demographic survey that included both multiple choice and open response items (see Appendix A). Self-identified race from this survey (Black/African-American, White/Caucasian) served as a moderator in subsequent analyses.

2.3.4 Measure of State-Trait Anxiety

State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, French, MacLeod, & Locke, 2008). The STICSA is a self-report questionnaire that assesses both cognitive and somatic symptoms across two subscales of state (i.e., in the moment) and trait (i.e., general) anxiety. The two subscales include an identical list of 21 items composed of 10 cognitive items (e.g., "think worst will happen" and 11 somatic items (e.g., "heart beats fast"). Respondents indicate how often each statement is true about themselves, first "at this very moment" and on the subsequent scale "in general", on a 4-point Likert-type scale (1 = "not at all", 4 = "very much so"). Within a nonclinical sample, the mean STICSA-State score was 35.0 and the average STICSA-Trait score was 37.0 (Grös, et al., 2007). Across participants with anxiety diagnoses including social phobia, panic disorder, and OCD the average STICSA-State score was 46.6 and the average STICSA-Trait score was 51.2.

A measure designed to better distinguish between pure anxiety symptoms and depressive symptoms than other commonly-used measures (e.g., State Trait Anxiety Inventory; Spielberger et al., 1983), the STICSA has demonstrated good discriminant validity

from measures of depression (Grös, Antony, Simms, & McCabe, 2007). Moreover, it shows good convergent validity with other measures of anxiety, including the STAI State and Trait and DASS scales (*rs* > .57). The measure also exhibited good internal consistency in clinical (STICSA State α=.88; STICSA Trait α= .87, for the cognitive and somatic subscales) and nonclinical samples (αs > .90) (Grös et al., 2007; Ree et al., 2008). Preliminary analyses conducted on the STICSA measures in this study suggested similar outcomes; both the STICA-State (α = .914) and STICSA-Trait (α = .915) demonstrated acceptable internal consistency. I included this measure to permit examination, in follow-up exploratory analyses, of the specificity of associations between intergroup anxiety and patterns of attentional bias.

2.3.5 Power Analysis

A power analysis was conducted using G*Power software, with linear multiple regression as the determined statistical test. Studies of threat-related attentional biases at short presentation times have yielded main effects that range in size from small to medium (Bantin et al., 2016; Bar-Haim et al., 2007). As an effect size based on an interaction term provided the closest approximation for this analysis, I used an f-value of .08, which is a small effect that is consistent with the interaction effect observed in a study that is comparable to the proposed research in terms of design and content (Bardeen & Orcutt, 2001). Both independent variables (threat bias score and participant self-identified race) were included as predictors in the calculation. With alpha error probability set at .05, the output calculated for R^2 increase revealed that in order to achieve 80% power to detect effects, a sample size of 101 was large enough to maximize power and reduce the potential for Type II error. I recruited 116 individuals to account for possible attrition and allow for a more conservative analysis.

2.3.6 Statistical Analyses

I tested the hypothesis that participant race would moderate the relationship between intergroup anxiety and attentional bias to threatening White and Black faces. I assessed for moderator effects of participant race on the association between intergroup anxiety and attentional bias for threat through linear regression. Crucially, regression allowed for the appropriate analysis of the intergroup anxiety predictor as a continuous variable, whereas other methods would necessitate dichotomization and potentially a loss of power to detect effects. This approach permitted me to explore variability within the full spectrum of intergroup anxiety in an ecologically valid manner (Maccallum et al, 2002; Irwin & McClelland, 2003).

I conducted two multiple hierarchical linear regression analyses to examine intergroup anxiety scores, participant race, and their interaction as predictors of attentional bias for threat. For the first model, bias scores for angry Black faces served as the dependent variable; for the second, bias scores for angry White faces were the dependent variable. In preparation for analyses, I mean-centered the predictor variable (intergroup anxiety) in order to minimize nonessential collinearity and to facilitate clearer interpretation of main effects. The moderator was dummy coded (0 = Black, 1 = White) to reflect two levels of the participant race variable.

Variables were entered into the hierarchical regression in two blocks: Block 1) mean-centered intergroup anxiety variable and participant race; and Block 2) the mean-centered intergroup anxiety x participant race interaction term. The interaction term was calculated by multiplying the mean-centered intergroup anxiety variable and the participant race variable.

3 RESULTS

3.1 Descriptive Statistics

I calculated descriptive statistics prior to conducting correlational and regression analyses (see Tables 2 and 3). Values were calculated for the whole sample ($N = 116$), as well as Black and White groups separately ($n = 58$, $n = 58$). In the overall sample, participants' attention was biased toward threatening faces in general ($M = 2.44$, $SD = 14.33$) and toward Black threatening faces, specifically ($M = 5.60$, $SD = 20.38$). On average, participants were slower to identify probes that replaced White threatening faces ($M = -.918$, $SD = 19.92$). While it is common to interpret *any* average bias score above 0 as an attentional bias *toward* a stimulus and any score below 0 as an attentional bias *away* from a stimulus (Mogg et al., 2000), some researchers choose instead to identify the presence of attentional bias when scores significantly differ from 0 (Mogg & Bradley, 2016). In the overall sample, bias for Black threatening faces ($M = 5.60$, 20.38) was significantly different from 0, $t(115) = 2.96$, $p = .004$, representing a modest bias. The full sample did not demonstrate biases significantly different from 0 for White threatening faces $t(115) = -.50$, $p = .621$ or threatening faces in general $t(115) = 1.84$, $p = .68$.

Group-level analyses suggest that White participants' bias scores may drive the significant bias for Black threatening faces in the overall sample. T-tests revealed that White participants demonstrated biases significantly different from 0 toward Black threatening faces, $t(57) = 2.43$, $p = .018$, while Black participants did *not* reveal statistically significant biases toward or away from Black threatening faces, $t(57) = 1.842$, $p = .071$.

Table 2. ***Overall Means and Standard Deviations for Participants (N = 116)***

Variable	Min	Max	M	SD
Bias for Threat Overall	-37.00	57.81	2.44	14.33
Bias for Black Threat	-50.67	82.40	5.60**	20.38
Bias for White Threat	-59.48	61.06	-.917	19.92
Intergroup Anxiety	16	150	80.53	30.422
STICSA State	21	67	34.11	11.814
STICSA Trait	21	70	39.13	12.250

Notes. STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety. Mean bias score values denoted with an asterisk(s) indicate statistical significance from zero. $^{**}p < .01$, $^{*}p < .05$.

Table 3. ***Group-level means and differences***

	Black (n = 58)		White (n = 58)			
	Mean	*SD*	Mean	*SD*	*t*	*p*
Bias for Threat Overall	2.67	15.30	2.23	13.42	.17	.868
Bias for Black Threat	5.51	22.78	5.69*	17.87	-0.05	.962
Bias for White Threat	0.05	18.35	-1.89	21.49	0.54	.601
Intergroup Anxiety	88.88	30.93	72.19	27.73	3.06**	.003
STICSA State	31.71	10.35	36.52	12.76	-2.23*	.028
STICSA Trait	35.93	11.21	42.33	12.50	-2.90**	.004

Notes. STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety. Mean bias score values denoted with an asterisk(s) indicate statistical significance from zero. T-values denoted with an asterisk(s) indicate significant group differences. $^{**}p < .01$, $^{*}p < .05$.

3.1.1 Trial-level bias score (TL-BS) analyses

Attentional bias scores toward overall threat were also calculated using trial- level bias score (TL-BS) parameters outlined in Zvielli, Bernstein, and Koster (2015). This strategy averages positive differences in reaction time between each threat-congruent trial and its neighboring threat-incongruent trial throughout the task. TL-BS scores account for potential fluctuations in attentional bias over the course of the dot probe run, and have demonstrated stronger psychometric properties than the traditional aggregated mean score in recent studies (Price et al., 2015). Other investigations of these new bias indices advise caution in interpreting results, which have been shown to be sensitive to measurement error (Krujit, Field, & Fox, 2016). Aggregated mean bias scores (as used to calculate attentional biases toward threat in the main analyses), trial-level bias scores, and attentional variability indices were calculated from this negative-only dot probe block. The trial-level biases scores included individual values for mean bias *toward* and mean bias *away* from threat in general. Separate bias scores for Black threatening faces and White threatening faces could not be calculated due to an insufficient number of threat trial pairs.

The aggregated mean bias scores for the negative-only block revealed that the entire sample (N = 116) on average demonstrated a slight bias toward threatening faces in general (M = .945), though this bias was not significantly different from 0, $t(115) = .546$, $p = .586$. Threat bias scores for individuals who identified primarily as Black (M = -1.86) and primarily as White (M = 3.769) were not independently significant, $t(57) = -.675$, $p = .502$ and $t(57) = 1.87$, $p = .067$), respectively. These bias scores were also not significantly different from each other, $t(114) = -1.644$, $p = .103$. While these results indicate that the two groups did not vary significantly in their attentional bias trends toward threatening faces, they suggest that Black participants on

average tended to attend *away* from threat to a small degree, and White participants on average tended to orient *toward* threat.

Analyses of trial-level bias scores reflecting mean bias toward threat yielded similar results, suggesting that Black participants (M = 68.51) and White participants (M = 63.77) did not significantly differ in their attentional allocations to threatening faces overall $t(114) = .845$, $p = .40$. The two groups did appear to differ significantly in their trial-level bias score reflecting mean bias *away* from threat, $t(114) = -2.209$, $p = .029$. Black participants (M = -73.42) appeared to demonstrate moderately larger biases away from threatening faces than did White participants (M = -60.50). Trial-level variability scores, which presumably reflect the fluctuations in attentional bias throughout the task, were also examined. Black participants (M = 91.53) and White participants (M = 79.50) did not significantly differ in their patterns of attention to threatening faces overall $t(114) = 1.708$, $p = .090$.

3.2 Testing Regression Assumptions

I took several preliminary steps to ensure that the dataset did not violate key assumptions of linear regression. Each of the dependent variables used in the analyses, including attentional bias scores for Black threatening faces and White threatening faces, displayed acceptable ranges of skewness and kurtosis. P-P and Q-Q plots further suggested that the data met the assumption of normality, as visual inspection indicated that severe deviations from the diagonal line were not present. Durbin-Watson statistics for both bias for Black threat (1.85) and bias for White threat (2.23) were within the recommended bounds, and scatterplots of error values displayed random patterns with no notable funneling, which suggested that the assumption of independence of errors had been met. Variances appeared to be equal for participants who identified primarily as Black and those who identified primarily as White across both threat bias

in Black faces [$F(1, 114) = 2.29$, $p = .13$] and threat bias in White faces [$F(1, 114) = .307$, $p = .58$]. Additionally, multicollinearity among predictors fell within acceptable bounds (VIFs < 5).

3.3 Data Preparation

Trials with incorrect responses (i.e., participant misidentified location of the probe) were excluded from analyses. Outliers were identified as reaction times below 200 ms and above three standard deviations from each participant's average response time and were also excluded from analyses. These bounds have been previously used to provide a clear and accurate reflection of response patterns (Price et al., 2015).

3.4 Preliminary Analyses

Zero-order correlations (see Tables 4, 5, and 6) were calculated among intergroup anxiety, generalized anxiety (STICSA State and Trait), and attentional bias scores for Black threat, White threat, and overall threat. When calculated for the overall sample, intergroup anxiety was significantly and positively associated with both state ($r = .398$, $p < .001$) and trait anxiety ($r = .411$; $p < .001$). There was no significant association between intergroup anxiety and any attentional bias for overall or race-specific threat. Attentional bias for Black threat and White threat were significantly and positively associated with overall threat bias (r's = .709 and .731, respectively; $p < .001$), but not significantly correlated with each other. Measures of state and trait anxiety were also highly correlated, consistent with findings in previous literature (Ree et al., 2008). No other correlations were statistically significant.

When I examined correlations separately by participant race rather than analyzing the full sample together, key group differences were evident. In the group of individuals who identified primarily as White, intergroup anxiety was positively and significantly correlated with both overall threat bias ($r = .272$; $p < .05$) and bias for Black threatening faces ($r = .307$; $p <$

.05), suggesting as intergroup anxiety increased, attentional prioritization for threat, and Black threat in particular, also increased. In the group of individuals who identified primarily as Black, no significant associations between intergroup anxiety and threat biases were found (all *p*'s > .05). Across both groups, significant correlations among the three anxiety scales, and between general threat bias and black and white threat biases, respectively, remained consistent with results from the overall sample.

T-tests indicated that individuals who identified primarily as Black and those who identified primarily as White differed significantly on measures of anxiety. Black individuals endorsed significantly higher levels of intergroup anxiety ($M = 88.88$, $SD = 30.93$) than did White individuals ($M = 72.19$, $SD = 27.73$), $t(114) = 3.06$, $p = .003$. In contrast, White individuals endorsed significantly higher levels of generalized state anxiety ($M = 36.52$, $SD = 12.76$) than did Black individuals ($M = 31.71$, $SD = 10.35$), $t(114) = -2.23$, $p = .028$. White individuals also reported higher generalized trait anxiety levels ($M = 42.33$, $SD = 12.50$) than Black individuals ($M = 35.93$, $SD = 11.21$), $t(114) = -2.90$, $p = .004$. Although these values reflect group differences in generalized anxiety, the mean STICSA scores for both groups fall within the nonclinical range (Grös, et al., 2007). Black and White participants did not differ significantly across attentional bias scores for general threat, Black threatening faces, or White threatening faces (all *p*'s > .05).

Table 4. ***Zero-Order correlations between variables- Full Sample (N = 116)***

Variables	1	2	3	4	5	6
1. Intergroup Anxiety	---	.398**	.411**	.116	-.073	.031
2. STICSA-State	---	---	.757**	.124	.023	.110
3. STICSA-Trait	---	---	---	.130	.008	.102
4. Bias for Black Threat	---	---	---	---	.041	.709**
5. Bias for White Threat	---	---	---	---	---	.731**
6. Bias for Threat Overall	---	---	---	---	---	---

Notes. STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety. * p < .05., **p < .01

Table 5. ***Zero-Order correlations between variables- Black participants***

Variables	1	2	3	4	5	6
1. Intergroup Anxiety	---	.394**	.451**	-.014	-.252	-.145
2. STICSA-State	---	---	.743**	.074	-.003	.006
3. STICSA-Trait	---	---	---	.055	-.045	.023
4. Bias for Black Threat	---	---	---	---	.098	.809**
5. Bias for White Threat	---	---	---	---	---	.661**
6. Bias for Threat Overall	---	---	---	---	---	---

Notes. STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety. * p < .05., **p < .01

Table 6. ***Zero-Order correlations between variables- White participants***

Variables	1	2	3	4	5	6
1. Intergroup Anxiety	---	.613**	.584**	.307*	.085	.272*
2. STICSA-State	---	---	.742**	.209	.097	.221
3. STICSA-Trait	---	---	---	.245	.103	.247
4. Bias for Black Threat	---	---	---	---	-.079	.588**
5. Bias for White Threat	---	---	---	---	---	.758**
6. Bias for Threat Overall	---	---	---	---	---	---

Notes. STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety. * p < .05., **p < .01

3.5 Regression Analyses

I conducted linear multiple regression analyses to examine intergroup anxiety scores, participant race, and their interaction as predictors of attentional bias for threat. I tested two hierarchical models, one with attentional bias score for Black threatening faces as the dependent variable, and the second with bias scored for White threatening faces as the outcome. Results from the first regression assessing whether participant race moderated the relationship between intergroup anxiety and attentional bias to Black threatening faces indicated that the overall model was not significant, $\Delta R2 = .022$, $F(3, 112) = 1.397$, $p > .05$. Main effects of intergroup anxiety ($\beta = -.015$, $p > .05$) and race ($\beta = .043$, $p > .05$) were not detected. The interaction between intergroup anxiety and race similarly failed to account for a significant portion of the variance in bias for Black threat ($\beta = .204$, $p > .05$) beyond that accounted for by intergroup anxiety and race.

The second regression model examining the moderating effect of participant race on the relationship between intergroup anxiety and attentional bias for White threatening faces was also not significant, $\Delta R2 = .025$, $F(3, 112) = 1.281$, $p > .05$. Main effects of intergroup anxiety (β = -

.228, $p > .05$) and race (β = -.066, $p > .05$) were not detected. Inclusion of the interaction term also did not account for a significant portion of the variance in bias for White threat (β = .216, $p > .05$). The results suggest that participant race did not moderate the association between intergroup anxiety and attentional bias for threat in both Black and White faces.

Table 7. ***Model 1: Predicting attentional bias for Black threat from intergroup anxiety and race***

	Step 1 (R^2=.014)		Step 2 (ΔR^2=.022)	
Predictors	*β*	*t*	*β*	*t*
Main Effects				
Intergroup Anxiety	.12	1.27	-.02	-.12
Race	.03	.40	.04	.45
Interaction				
Intergroup Anxiety x Race			.20	1.60

Note. $N = 116$. F-test of change from Step 1 to Step 2: $F = 2.55$; $df = 1, 112$, $p = .11$

Table 8. ***Model 2: Predicting attentional bias for White threat from intergroup anxiety and race***

	Step 1 (R^2=.009)		Step 2 (ΔR^2=.025)	
Predictors	*β*	*t*	*β*	*t*
Main Effects				
Intergroup Anxiety	-.08	-.84	-.23	-1.76
Race	-.07	-.73	.07	-.69
Interaction				
Intergroup Anxiety x Race			.22	1.69

Note. $N = 116$. F-test of change from Step 1 to Step 2: $F = 2.85$; $df = 1, 112$, $p = .094$

4 DISCUSSION

4.1 Overview of study hypotheses and results

The current study examined associations between intergroup anxiety and attentional bias for threat in Black and White faces. I hypothesized first that all participants, regardless of their intergroup anxiety, would show biased attention toward angry faces. In addition, I hypothesized that participant race would moderate the relationship between intergroup anxiety and attention bias for angry faces, such that anxiety would be more strongly associated with biased attention toward anger displayed by members of participants' outgroups than anger displayed by members of participants' ingroups.

Results partially supported the first hypothesis—across the full sample, participants displayed modest, but statistically non-significant, attentional biases toward general threat (angry faces, regardless of race). The full sample showed slightly larger—and statistically significant—attentional biases toward Black angry faces. Additional group-level analyses suggested that White participants' bias scores were largely responsible for this pattern of enhanced prioritization for Black threat. White participants demonstrated significant attentional biases toward Black threatening faces, while Black participants did not show significant biases for Black threatening faces. Neither group showed significant biases to direct attention toward or away from White threatening faces. These results are in line with at least one previous study in a healthy White sample, in which participants showed significantly faster attentional orientation toward angry Black faces than toward angry White faces (Otten, 2016). They diverge, however, from the results of research that has compared attention to racially diverse, but emotionally neutral, faces between Black and White individuals that demonstrated prioritization for outgroup faces across both groups (Dickter & Bartholow, 2008).

With regard to the second hypothesis, multiple regression analyses did not yield results that support the proposed models: participant race did not moderate the association between intergroup anxiety and attentional bias for threat in either Black or White faces. However, exploratory analyses did reveal findings that are consistent with earlier research in exclusively White samples. Specifically, for White participants, intergroup anxiety was positively associated with biased attention toward outgroup, but not ingroup, anger. These findings, which I discuss in more detail below, offer insight into group-level differences in attentional biases for threat, and provides new avenues for exploration of intergroup anxiety.

4.2 Intergroup anxiety, participant race, and attention for outgroup threat

My study extended the extant dot probe literature to include both White and Black participants and a more comprehensive measure of intergroup anxiety. Among individuals who identified primarily as white, higher levels of intergroup anxiety were associated with stronger attentional biases toward outgroup threat; those who identified primarily as Black did not demonstrate a similar outgroup bias for White threatening faces. The evidence that White participants' intergroup anxiety was positively related to attentional prioritization for outgroup threat aligns with findings from Richeson and Trawalter's (2008) study that examined facets of intergroup anxiety, race and attention for in/outgroup faces using the dot probe task. In this study, White participants higher in external motivation (EM) to avoid prejudice, a facet of intergroup anxiety, but not those lower in EM, displayed attentional biases for Black faces. Importantly, this bias emerged on trials with fast presentation times (30 ms), but not those with longer presentation times (450 ms). Notably, no bias was detected when participants viewed happy faces, suggesting a valence-specific bias for threat in particular.

The results appear to reflect prior findings that intergroup anxiety is associated with magnified threat perception of outgroup faces among White participants. It remains unclear why similar patterns were not evident among Black participants, who endorsed significantly higher levels of intergroup anxiety than White participants. While outgroup compared to ingroup members have long been hypothesized to represent potential danger (Cosmides et al., 2003), it may be that the source of the threat varies by perceiver. Stephan et al.'s (2002) test of their integrated threat model, for instance, suggested that, although intergroup anxiety predicts negative outgroup attitudes in both White and Black participants, the reasons underlying those attitudes may vary. For white participants, "realistic threat" regarding Black individuals (i.e., concerns that those who are Black constitute a threat to their political/economic power, physical/material well-being) was a stronger predictor of negative attitudes. For Black participants, in contrast, "symbolic threat" (i.e., concern that those who are White pose threats to their ingroup culture, values, or world view) was a stronger predictor.

Angry outgroup faces within the dot probe task may serve as "realistic threat" signals that convey imminent personal danger and that are particularly salient for White individuals. Such faces thus may draw White participants' attention at especially rapid speeds. This possibility appears to align with Pergamin-Hight and colleagues' (2015) findings suggesting that the content specificity of the threatening stimulus to the fears of the viewer (in this case, Black angry faces may be more evocative of White individuals' intergroup anxiety-related concerns) drives attentional biases. Caution may thus be warranted in generalizing findings from research on attentional biases for threat in predominantly White samples, given that most studies to date using dot probe tasks have not included Black participants.

Moreover, the present findings suggest that research may need to consider race in more nuanced ways than is typical. For example, it may be important to take into account the status of a given racial group in the context that participants inhabit. In work relevant to this issue, Riek et al., (2006) suggested that group status (high/low) may moderate associations between intergroup anxiety and cognitive outcomes such as negative attitudes. They posited, for example, that lower status group members (Black Americans, in their study) may have more experience interacting with higher status group members (White Americans) than vice versa. Thus members of groups treated as lower status may have "adapted" to their own intergroup anxiety in a way that minimizes its influence on their attitudes. Stephan et al. (2002) further suggested that Black individuals, as a historically marginalized and "low power" group, may display reduced reactivity to threats posed by White individuals as they have "less to lose, having already been dispossessed by so much" (p. 1252).

This idea that low status may attenuate reactivity to outgroup threat, however, conflicts with assertions that lower-status individuals should display *hypervigilance* for cues of social threat precisely because of their history as targets of prejudice and discrimination. Ong (2013) suggested that faster identification of threat from higher status individuals should function as a defense mechanism that allows members of low-status groups to better anticipate and prevent discriminatory treatment. Perhaps the context in which threat cues are presented matters more for those from lower-status groups than those from higher status groups. Cues presented via static images in a low-stakes computer task, for instance, may not elicit the same responses from low-status group members as cues that appear during real-life, emotionally-charged interactions where the probability of mistreatment can be high. Future work might explore this possibility by amplifying the ecological validity, potentially staging real-world interaction with

confederates who vary as a function of status. Research might also recruit participants from regions where people with different racial identities hold varying levels of status.

4.3 TL-BS

Given that recent research has raised concerns about the use of traditionally-calculated aggregated mean bias scores in dot probe studies (Price et al., 2015), I included a negative-only dot probe block, which comprised solely angry-neutral and neutral-neutral trials (i.e., happy-neutral trials removed) and allowed me to calculate bias scores in two ways (aggregated mean bias score and trial-level bias score) and extract a bias variability score. I calculated the traditional aggregated mean threat bias score for this negative-only block just as I did for the main dot-probe block (i.e., the block with angry-neutral, happy-neutral, and neutral-neutral trials), and I obtained similar findings. Just as they did during the main task block, all participants, on average, demonstrated small, non-significant biases toward threatening faces. Also consistent with findings for the main task, Black participants and White participants did not significantly differ in this aggregated mean bias toward threat. Similarly, Black and White participants did not significantly differ in their TL-BS score reflecting mean bias toward threat. Black and White participants did, however, differ significantly in their trial-level bias scores reflecting mean bias *away* from threat in general, with Black participants displaying stronger biases away from threat than White participants. The bias scores themselves were not statistically different from zero.

Additionally, the two participant groups did not differ significantly in their attentional bias variability scores. Previous studies that have used dot probe variability scores have detected significant differences between healthy and clinical samples (Iacoviello et al., 2014; Naim et al.,

2015; Zvielli et al., 2015). Results from the present study suggest that within a non-clinical sample, such differences may not be evident.

Although Black and White participants did differ significantly on measures of intergroup anxiety and state and trait anxiety, mean scores for members of both groups were below cutoffs on trait anxiety measures that indicate likely presence of clinical psychopathology (Grös et al., 2007). Moreover, the two groups displayed similar patterns of fluctuation in attention to threat throughout the dot probe task. It will be important for future research to more closely examine attention bias variability in non-clinical samples to determine the utility of such measures for understanding the full spectrum of anxious symptoms. However, even null findings like those obtained in the present study are informative, as they suggest that the two groups did not vary on an increasingly prioritized facet of visual attention (Molloy, 2018), which could have introduced additional confounds to the central models tested.

4.4 New insights about intergroup anxiety

Although the construct of intergroup anxiety per se was not the primary focus of this study, we nonetheless obtained findings that may help us better understand it. Specifically, we examined associations between intergroup anxiety and both state and trait anxiety in both Black and White young adults. For both the full sample and Black and White groups separately, intergroup anxiety was significantly and positively correlated with state and trait anxiety. These findings suggest that, regardless of whether intergroup-anxious individuals identify with a majority or minority racial group, they also experience considerable anxiety in contexts that do not necessarily involve interaction with members of other groups. This is important, because research on the potential overlap between intergroup anxiety and other forms of anxiety or psychopathology is sparse. Indeed, there appears to be just one published study that has

examined the boundaries of these constructs. Britt et al. (1996) found that White, high intergroup anxious individuals endorsed greater state anxiety before interacting with Black individuals than before interacting with White individuals. While explorations of the relationship between intergroup anxiety and other forms of anxiety are limited, the present study suggests intergroup anxiety and generalized anxiety are highly correlated. Future analyses may consider the possibility that different kinds of anxiety may impact attentional allocation in distinctive ways or in different contexts.

Moreover, Black participants endorsed significantly higher levels of intergroup anxiety, or anxiety related to social interactions with White people than White participants endorsed regarding interactions with Black people, consistent with findings from a prior study that examined intergroup anxiety in a diverse sample (Stephan et al., 2002). It may be that as members of a historically marginalized group within the United States, Black study participants may experience heightened anxiety related to anticipated and experienced negative interactions with White individuals. Indeed, in the U.S., nearly half of Black individuals have reported being targets of racial violence, personal and institutional discrimination, and slurs and insensitive comments (NPR/Harvard, 2017).

White participants, however, reported significantly higher average levels of generalized state and trait anxiety than did Black participants. Epidemiological studies examining mental health in diverse populations are limited, though some have documented higher rates of anxiety disorders in African American and Caribbean Black populations compared to White individuals (Watkins, Assari, & Johnson-Lawrence, 2015). However, it is important to note that the extent to which group differences in symptom reporting patterns and mental health education regarding anxiety and other psychiatric diagnoses (Snowden, 2012) may have affected our self-report data

is unclear. It is possible that, although individuals who identify primarily as Black may exhibit a distinctive profile of generalized anxiety (Carter, Sbrocco, & Carter, 1996) or may be reluctant to endorse symptoms of generalized anxiety due to stigma (Hunter & Schmidt, 2010; Ward, Clark, & Heidrich, 2009), they are more willing to endorse anxiety associated with negative intergroup interactions, given that such anxiety may be culturally sanctioned (Hunter & Schmidt, 2010).

4.5 Limitations and Strengths

4.5.1 Presentation Time

In addition to intergroup anxiety and participant race, the two main predictors in the regression model, other variables may have contributed to participants' perception of and orientation to threat on in- or outgroup faces. One such variable is the stimulus presentation time. Participants in this study viewed emotional face pairs for a very short presentation time (100 ms). Several studies have suggested that shorter (thus faster) presentation times allow for more precise capture of early visual attention. Van Rooijen et al. (2017) noted that within the traditional, longer 500 ms timeframe used in the dot probe task, viewers have the ability to make multiple saccades, or eye movements, and trial responses are therefore unlikely to reflect initial orientation. Investigations using fMRI also commonly find differences in neural activity when viewing ingroup and outgroup faces during *short* stimulus presentation times (e.g., 30 ms) that are no longer evident when exposure windows are lengthened (e.g., 450 ms). Thus, initial social-emotional processing in the brain appears to occur rapidly and may later be suppressed or regulated by activity in neural regions (e.g., DPFC, ACC) related to executive control (Cunningham et al., 2004; Richeson & Trawalter, 2008).

It nonetheless remains unclear how viewers, during a very brief window of exposure, allocate their attentional resources when faces convey multiple social and emotional cues. While a shorter presentation time allowed for a more targeted examination of early attentional allocation, it is possible that limiting viewing time led to prioritization of one cue over another, or reduced the full and equal processing of both emotional expression and race. For instance, in a ERP study that required participants to view neutral images of Black and White male and female faces, Ito and Urland (2003) found that White participants oriented to racial cues as early as 100 ms after stimulus onset, while attention to gender cues peaked nearly 50 ms later. Dickter and Bartholow (2007) also found evidence of early attentional prioritization for race, as their ERP data suggested that participants attended to racial cues even when those cues were task-irrelevant (i.e., instructed to focus on gender). Thus, although emotional expression and race have been shown to magnify the perception of threat on a face in later stages of processing (e.g., Ackerman et al., 2006), attention for certain facial qualities may occur during early—but different—time periods in early visual attention.

In a later ERP study, Ito, Thompson, and Cacioppo (2004) examined the time course of attention for both race and emotionality in displayed faces. They noted that while both race and emotion are processed early (170 ms or faster), the two factors appear to be processed "independently and in parallel", with only marginal evidence of interactions in early stages of processing (p. 13). In other words, while several studies have documented faster attentional orienting for Black faces over White faces (Al-Janabi, MacLeod, & Rhodes, 2012; Trawalter et al., 2008) and for threatening faces over happy or neutral ones (Bar-Haim et al., 2007), it remains unclear if race and emotion together magnify attentional biases for Black, threatening faces in particular in very early attention.

Variations in participant anxiety may also impact the speed at which emotional cues are detected. Sass et al. (2010) noted that ERP responses to emotional stimuli appear earlier in anxious samples than in healthy samples. Further, the time course of this response in early visual processing can vary as a function of anxiety subtype; participants who endorse more symptoms of anxious *arousal* appear to demonstrate earlier (~100 ms) effects than participants who endorse increased anxious *apprehension* (Sass et al., 2010). This suggests that even subtle differences in viewer profiles may influence the sensitivity to emotion-related cues.

4.5.2 Additional facial features that signify threat

This study was one of very few focused on attentional bias for emotional faces that included both a diverse facial stimulus set and a diverse participant sample. In particular, prior studies have typically recruited only White participants. A growing body of research suggests that attention to diversity in both stimulus cues and participants is important (Cundiff, 2012). Findings from several studies suggest that varied facial features can guide attention and potentially increase the salience or threat value of a face; for example, people tend to view both juvenile features (Zebrowitz, 2017) and faces that resemble more familiar individuals as more trustworthy and less threatening (Zebrowitz et al., 2007).

Further, features associated with racial group membership also appear to influence rapid orienting to and evaluation of stimuli. Recent investigations have found that both White and Black participants tended to perceive individuals with features more stereotypically identified as "Black", such as darker skin, broader noses, and fuller lips, as threatening (Kleider- Offutt, Bond, Williams, & Bohil, 2018). Black individuals with more stereotypical features were also more likely to be "shot" in the context of a shoot/don't shoot task (Kahn and Davies, 2010). Indeed, researchers have found both White and Black participants to be especially likely to

associate Black faces with negative qualities such as danger and criminality when the faces displayed these stereotypical features (Kleider-Offutt, Bond, & Hegerty, 2017; Kleider, Cavrak, & Knuycky, 2012). These findings suggest that stereotypes about physiognomy may play an influential role in the perception of threat value separate from, but also potentially in interaction with, emotional expression.

Although we carefully validated the stimulus faces used in our dot probe task to ensure that they expressed equivalent degrees of particular emotions, we did not characterize them according to these additional facial qualities. Additionally, in efforts to closely match this dot probe task to those used commonly in the literature (e.g., Klumpp & Amir, 2009; Mogg, Philippot, & Bradley, 2004), we presented stimulus faces in grayscale. It is possible that the use of grayscale rather than color images, a practice designed to control for variables that influence visual salience such as luminosity, reduced the task's ecological validity and may have obscure potentially important effects of skin tone variation on rapid threat appraisal.

Taken together, the studies exploring race-related physiognomy suggest that associations between stereotypically Black racial features and threat, even in the absence of explicit emotionality (e.g., angry expression) may influence perception of Black faces as particularly dangerous or threatening. These findings lay a foundation for next steps toward enhancing facial dot probe task result's generalizability to members of diverse populations. Researchers, especially those studying diverse samples, may benefit from mindfully selecting stimuli with efforts to balance the presentation of relevant facial features to allow for examination of their impact on threat evaluation.

4.5.3 Intergroup anxiety—a more nuanced construct?

While individuals with high levels of intergroup anxiety tend to demonstrate concern about the outcome of intergroup interactions, the precise source or content of anxiety can vary. Greenland et. al (2012) proposed that intergroup anxiety contains two distinct constructs: self-anxiety—anxiety that one will think or behave in a way that is prejudiced—and other-anxiety—anxiety that outgroup members may pose a threat of harm. Consistent with this idea, empirical evidence suggests that group-level differences such as majority/minority status are associated with distinct intergroup concerns; whereas majority group members may worry primarily about appearing prejudiced, minority group members may endorse worries primarily about being discriminated against (Doerr et al., 2011; Shelton & Richeson, 2006). Findings from the present study raise the possibility that, at least within the context of the dot-probe task, increased vigilance for threat on an outgroup face is more strongly related to fears of appearing prejudiced than fears of experiencing discrimination. Thus, the global intergroup anxiety measure used in this study may have been insufficiently precise for use with diverse individuals for whom items may have held different meanings. Additional research on the nuances of intergroup anxiety may allow for a more detailed understanding of its influence on attentional allocation.

4.6 Future Directions

Results of the present moderation analyses suggested that race did not significantly moderate the relationship between intergroup anxiety and attentional bias for threat on Black or White faces. It may be that we inadequately accounted for several variables that earlier research has linked to differences in emotion perception and that may also contribute to potential variance in attentional bias for threat. Numerous studies have shown, for example, that implicit attitudes, or judgements "outside conscious attentional focus" (Greenwald & Banaji, 1995) about Black

individuals or stereotypically Black features, can influence threat perception. For instance, Cunningham and colleagues (2004) found that stronger negative implicit associations regarding outgroup or Black individuals relate to greater amygdala activation for Black than White faces among White adults. Negative implicit associations have also been linked to more rapid identification of anger presented on Black faces than White faces (Hugenberg & Bodenhausen, 2003), increased threat evaluation for outgroup faces (Maner et al., 2005, study 2), and greater attentional preference for Black angry faces (Otten, 2016). Together, these outcomes suggest more accessible negative attitudes or stereotypes about members of a group can amplify the threat value of faces from that group, at least early in the attentional process. In the present dataset, it is possible that including implicit associations as predictors of attentional bias for threat as covariates in the regression model would facilitate accurate detection of associations between intergroup anxiety and attention bias for threat. Future research in attentional allocation for emotional faces, and particularly those that incorporate diverse stimuli and participants, may consider inclusion of an implicit associations measure to permit precise characterization of factors that contribute to biases in attention.

A second pathway for future work might include examination of other in/outgroup variables. While treating race as the primary group variable allowed for a detailed exploration of how racial intergroup anxiety might modulate attention for threat, other group-related variables may warrant similar examination. Gender, for example, is also a salient marker of group membership, and men and women may also process emotional stimuli in different ways. Indeed, men and women have shown differences in their neural processing of emotional images (Lang et al., 1998); threat evaluation (Maner et al., 2005) and attentional bias for emotional faces within the dot probe task (Carlson, Aday, & Rubin, 2018). Moreover, Sass et al. (2010) found that men

demonstrated preferential processing of threatening stimuli in an emotion-word Stroop task at considerably earlier stages of visual processing (100 ms) than did women (300 ms).

Further, studies that have considered *stimulus* gender along with race have shown that male outgroup faces tend to be evaluated as more threatening than female faces (Becker et al., 2007). In the context of the present study, it is possible that attentional bias for threat varied depending on the intersection of stimulus race and gender; for example, White participants' attention to anger could have been heightened when it appeared on a Black male face than on a Black female face. Unfortunately, our task includes insufficient numbers of stimuli to examine bias at this level of detail, but future dot probe versions might be extended to permit examination of multiple intersecting stimulus characteristics as modulators of threat. Further, use of intergroup anxiety measures that target gender rather than race may facilitate exploration of the relationship between gender-based intergroup anxiety and attentional bias for threat in race- and gender-diverse faces.

4.7 Conclusions

The current study is the first that we are aware of to use a dot probe task to examine the relationship between intergroup anxiety and Black and White participants' attentional bias for threat in Black and White faces. Key findings revealed group differences in attentional biases for outgroup threat, such that White, but not Black, participants displayed significant biases toward Black threatening faces, which was consistent with prior research. The findings also yielded insight into the cognitive and affective profiles of individuals high in intergroup anxiety. Specifically, we found positive, significant associations between intergroup anxiety and both state and trait anxiety; further work is needed to test Stephan's (2014) assertion that intergroup anxiety represents a more specific facet of social anxiety.

Additionally, among White participants only, increases in intergroup anxiety were associated with increases in attentional bias toward Black, but not White, faces. We failed, however, to detect a significant moderational effect of participant race on the relationship between intergroup anxiety and attention bias for threat in Black or White faces. It is possible that our use of rapid stimulus presentation times, our inability to take additional phenotypic markers of race into account, and a global measurement of intergroup anxiety, precluded us from detecting a statistical moderation effect. Overall, however, the present findings suggest that elements of the facial context (i.e., stimulus race) in which an angry expression appears may magnify its threat value for some individuals. These results suggest that stimulus and participant demographic and identity characteristics are important considerations for new studies using the facial dot probe task. Future dot probe studies might include additional variables, such as implicit attitudes and gender, as extant research suggests they may play a role in attentional bias for threat.

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APPENDICES

Appendix A. Demographic Questionnaire

What is your Age (in years)?

What is your gender identity?

1. Woman
2. Man
3. Transgender
4. Self-identify (please specify)

What was your sex at birth?

1. Female
2. Male
3. Intersex

Do you consider yourself to be:

1. Heterosexual
2. Lesbian
3. Gay
4. Bisexual
5. Questioning
6. Self-identify (please specify)

People are different in their sexual attraction to other people. Which best describes your current feelings? Are you:

1. Only attracted to women
2. Mostly attracted to women
3. Equally attracted to women and men
4. Mostly attracted to men
5. Only attracted to men
6. Not sure

What is your race/ethnicity?

1. African American / Black
2. American Indian or Alaskan Native
3. Asian American / Asian
4. Hispanic / Latino/a
5. Native Hawaiian or Pacific Islander
6. Multi-racial
7. White
8. Self-identify (please specify)

If you would like to, please further describe your racial, cultural, ethnic, or regional identity:

What is your country of origin?

Are you an international student?

1. Yes
2. No

Relationship status:

1. Single
2. Serious dating or committed relationship
3. Civil union, domestic partnership, or equivalent
4. Married
5. Separated
6. Divorced
7. Widowed

Religious or spiritual preference:

1. Agnostic
2. Atheist
3. Buddhist
4. Catholic
5. Christian
6. Hindu
7. Jewish
8. Muslim
9. No preference
10. Self-identify (please specify)
11. Other religious or spiritual preference:

To what extent does your religious or spiritual preference play an important role in your life?

1. Very Important
2. Important
3. Neutral
4. Unimportant
5. Very unimportant

Current academic status:

1. Freshman / First-year
2. Sophomore
3. Junior
4. Senior
5. Graduate / professional degree student
6. Non-student
7. High-school student taking college classes
8. Non-degree student
9. Faculty or staff

Other (please specify)

With whom do you live? (check all that apply)

1. Alone
2. Spouse, partner, or significant other
3. Roommate(s)
4. Children
5. Parent(s) or guardian(s)
6. Family other
7. Other (please specify)

Did you transfer from another campus/institution to this school?

1. Yes
2. No

What is the average number of hours you work per week during the school year (paid employment only)?

Are you the first generation in your family to attend college?

1. Yes
2. No

How would you describe your financial situation right now?:

1. Always stressful
2. Often stressful
3. Sometimes stressful
4. Rarely stressful
5. Never stressful

How would you describe your financial situation while growing up?:

1. Always stressful
2. Often stressful
3. Sometimes stressful
4. Rarely stressful
5. Never stressful

Appendix B. State-Trait Inventory for Cognitive and Somatic Anxiety

State Trait Inventory for Cognitive and Somatic Anxiety-State Version

Below is a list of statements which can be used to describe how people feel. Beside each statement are four numbers which indicate the degree with which each statement is self-descriptive of mood at this moment (e.g., 1=*not at all*, 4=*very much so*). Please read each statement carefully and circle the number which best indicates how you feel right now, at this very moment, even if this is not how you usually feel.

1.	My heart beats fast	1	2	3	4
2.	My muscles are tense.	1	2	3	4
3.	I feel agonized over my problems.	1	2	3	4
4.	I think that others won't approve of me.	1	2	3	4
5.	I feel like I'm missing out on things because I can't make up my mind soon enough.	1	2	3	4
6.	I feel dizzy.	1	2	3	4
7.	My muscles feel weak.	1	2	3	4
8.	I feel trembly and shaky.	1	2	3	4
9.	I picture some future misfortune.	1	2	3	4
10.	I can't get some thought out of my mind.	1	2	3	4
11.	I have trouble remembering things.	1	2	3	4
12.	My face feels hot.	1	2	3	4
13.	I think that the worst will happen.	1	2	3	4
14.	My arms and legs are stiff.	1	2	3	4
15.	My throat feels dry.	1	2	3	4
16.	I keep busy to avoid uncomfortable thoughts.	1	2	3	4
17.	I cannot concentrate without irrelevant thoughts intruding.	1	2	3	4
18.	My breathing is fast and shallow.	1	2	3	4
19.	I worry that I cannot control my thoughts as well as I would like to.	1	2	3	4
20.	I have butterflies in my stomach.	1	2	3	4
21.	My palms feel clammy.	1	2	3	4

State Trait Inventory for Cognitive and Somatic Anxiety-Trait Version

Below is a list of statements which can be used to describe how people feel. Beside each statement are four numbers which indicate how often each statement is true of you (e.g., 1=*not at all*, 4= *very much so*). Please read each statement carefully and circle the number which best indicates how often, in general, the statement is true of you.

1.	My heart beats fast	1	2	3	4
2.	My muscles are tense.	1	2	3	4
3.	I feel agonized over my problems.	1	2	3	4
4.	I think that others won't approve of me.	1	2	3	4
5.	I feel like I'm missing out on things because I can't make up my mind soon enough.	1	2	3	4
6.	I feel dizzy.	1	2	3	4
7.	My muscles feel weak.	1	2	3	4
8.	I feel trembly and shaky.	1	2	3	4
9.	I picture some future misfortune.	1	2	3	4
10.	I can't get some thought out of my mind.	1	2	3	4
11.	I have trouble remembering things.	1	2	3	4
12.	My face feels hot.	1	2	3	4
13.	I think that the worst will happen.	1	2	3	4

14.	My arms and legs are stiff.	1	2	3	4
15.	My throat feels dry.	1	2	3	4
16.	I keep busy to avoid uncomfortable thoughts.	1	2	3	4
17.	I cannot concentrate without irrelevant thoughts intruding.	1	2	3	4
18.	My breathing is fast and shallow.	1	2	3	4
19.	I worry that I cannot control my thoughts as well as I would like to.	1	2	3	4
20.	I have butterflies in my stomach.	1	2	3	4
21.	My palms feel clammy.	1	2	3	4

Appendix C. Intergroup Anxiety Measure

Intergroup Anxiety Scale—adapted from Stephan & Stephan (1985)

For self-identified Black/African-American participants:

Instructions: The following set of questions concerns situations you could find yourself in when interacting with White/Caucasian individuals. Please indicate how you would react to these situations. In each situation you would be the only Black/African-American individual present. The other people would be White/Caucasian.

1. Going to a small party (less than 15 people)

1 2 3 4 5 6 7 8 9 10

Not at all self-conscious ---Extremely self-conscious

2. Spending time with a member of the opposite sex

1 2 3 4 5 6 7 8 9 10

Not at all anxious ----------Extremely anxious

3. Meeting strangers and introducing yourself

1 2 3 4 5 6 7 8 9 10

Not at all nervous ----------Extremely nervous

4. Being caught up in a large crowd (for instance, a demonstration)

1 2 3 4 5 6 7 8 9 10

Not at all tense ----------Extremely tense

5. People staring at you and talking about you among themselves

1 2 3 4 5 6 7 8 9 10

Not at all uncomfortable ----Extremely uncomfortable

6. Giving a speech to members of this group (50 people or so)

1 2 3 4 5 6 7 8 9 10

Not at all worried ----------Extremely worried

7. Dealing with several members of this group who seem threatening

1 2 3 4 5 6 7 8 9 10

Not at all afraid ----------Extremely afraid

8. Being criticized unjustly for something you did

1 2 3 4 5 6 7 8 9 10

Not at all upset ----------Extremely upset

9. Being unable to make yourself understood when it is important

1 2 3 4 5 6 7 8 9 10

Not at all frustrated ----------Extremely frustrated

10. Being laughed at for a minor mistake you have made

1 2 3 4 5 6 7 8 9 10

Not at all embarrassed ---Extremely embarrassed

11. Being taken advantage of (for instance, by a merchant)

1 2 3 4 5 6 7 8 9 10

Not at all angry ----------Extremely angry

12. Being totally ignored by the people at a social gathering

1 2 3 4 5 6 7 8 9 10

Not at all rejected ----------Extremely rejected

13. Unintentionally offending a member of the other group by making a small social error

1 2 3 4 5 6 7 8 9 10

Not at all guilty ----------Extremely guilty

14. People refusing to talk to you because they dislike your group

1 2 3 4 5 6 7 8 9 10

Not at all offended ----------Extremely offended

15. Feeling that your group is being unfairly criticized by members of the other group

1 2 3 4 5 6 7 8 9 10

Not at all defensive ----------Extremely defensive

<u>For self-identified White/Caucasian participants:</u>

Instructions: The following set of questions concerns situations you could find yourself in when interacting with Black/African-American individuals. Please indicate how you would react to these situations. In each situation you would be the only White/Caucasian individual present. The other people would be Black/African-American.

1. Going to a small party (less than 15 people)

1 2 3 4 5 6 7 8 9 10

Not at all self-conscious ---Extremely self-conscious

2. Spending time with a member of the opposite sex

1 2 3 4 5 6 7 8 9 10

Not at all anxious ----------Extremely anxious

3. Meeting strangers and introducing yourself

1 2 3 4 5 6 7 8 9 10

Not at all nervous ----------Extremely nervous

4. Being caught up in a large crowd (for instance, a demonstration)

1 2 3 4 5 6 7 8 9 10

Not at all tense ----------Extremely tense

5. People staring at you and talking about you among themselves

1 2 3 4 5 6 7 8 9 10

Not at all uncomfortable ----Extremely uncomfortable

6. Giving a speech to members of this group (50 people or so)

1 2 3 4 5 6 7 8 9 10

Not at all worried ----------Extremely worried

7. Dealing with several members of this group who seem threatening

1 2 3 4 5 6 7 8 9 10

Not at all afraid ----------Extremely afraid

8. Being criticized unjustly for something you did

1 2 3 4 5 6 7 8 9 10

Not at all upset ----------Extremely upset

9. Being unable to make yourself understood when it is important

1 2 3 4 5 6 7 8 9 10

Not at all frustrated ----------Extremely frustrated

10. Being laughed at for a minor mistake you have made

1 2 3 4 5 6 7 8 9 10

Not at all embarrassed ---Extremely embarrassed

11. Being taken advantage of (for instance, by a merchant)

1 2 3 4 5 6 7 8 9 10

Not at all angry ----------Extremely angry

12. Being totally ignored by the people at a social gathering

1 2 3 4 5 6 7 8 9 10

Not at all rejected ----------Extremely rejected

13. Unintentionally offending a member of the other group by making a small social error

1 2 3 4 5 6 7 8 9 10

Not at all guilty ----------Extremely guilty

14. People refusing to talk to you because they dislike your group

1 2 3 4 5 6 7 8 9 10

Not at all offended ----------Extremely offended

15. Feeling that your group is being unfairly criticized by members of the other group

1 2 3 4 5 6 7 8 9 10

Not at all defensive ----------Extremely defensive